PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 700953-53671	FOR FURTHER ACTION	See Form PCT/IPEA/416
International application No. PCT/US04/38643	International filing date *(day/month/year)* 12 November 2004 (12.11.2004)	Priority date *(day/month/year)* 12 November 2003 (12.11.2003)

International Patent Classification (IPC) or national classification and IPC

IPC: C07H 21/02(2006.01);C12N 15/00(2006.01);A61K 48/00(2006.01)
USPC: 536/23.1,435,320.1,514,44

Applicant

THERION BIOLOGICS CORPORATION

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. ☒ *(sent to the applicant and to the International Bureau)* a total of 4 sheets, as follows:
      ☐ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s)) _____ , containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).
4. This report contains indications relating to the following items:
   - ☒ Box No. I Basis of the report
   - ☐ Box No. II Priority
   - ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - ☐ Box No. IV Lack of unity of invention
   - ☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - ☐ Box No. VI Certain documents cited
   - ☐ Box No. VII Certain defects in the international application
   - ☐ Box No. VIII Certain observations on the international application

Date of submission of the demand	Date of completion of this report
07 April 2005 (07.04.2005)	17 February 2006 (17.02.2006)
Name and mailing address of the IPEA/ US Mail Stop PCT, Attn: IPEA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (571) 273-3201	Authorized officer Ram Shukla Telephone No. (571) 272.1600

Form PCT/IPEA/409 (cover sheet)(April 2005)

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/US04/38643

Box No. I Basis of the report

1. With regard to the **language**, this report is based on:
   - ☒ the international application in the language in which it was filed.
   - ☐ a translation of the international application into English, which is the language of a translation furnished for the purposes of:
     - ☐ international search (under Rules 12.3 and 23.1(b))
     - ☐ publication of the international application (under Rule 12.4(a))
     - ☐ international preliminary examination (under Rules 55.2(a) and/or 55.3(a))

2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:
   - ☐ the international application as originally filed/furnished
   - ☒ the description:
     pages 1-72 as originally filed/furnished
     pages* NONE received by this Authority on _____
     pages* NONE received by this Authority on _____
   - ☒ the claims:
     pages NONE as originally filed/furnished
     pages* NONE as amended (together with any statement) under Article 19
     pages* 73-76 received by this Authority on 17 November 2005 (17.11.2005)
     pages* NONE received by this Authority on _____
   - ☒ the drawings:
     pages 1-14 as originally filed/furnished
     pages* NONE received by this Authority on _____
     pages* NONE received by this Authority on _____
   - ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.

3. ☒ The amendments have resulted in the cancellation of:
   - ☒ the description, pages NONE
   - ☒ the claims, Nos. NONE
   - ☒ the drawings, sheets/figs NONE
   - ☒ the sequence listing (*specify*): NONE
   - ☒ any table(s) related to the sequence listing (*specify*): NONE

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
   - ☐ the description, pages _____
   - ☐ the claims, Nos. _____
   - ☐ the drawings, sheets/figs _____
   - ☐ the sequence listing (*specify*): _____
   - ☐ any table(s) related to the sequence listing (*specify*): _____

** If item 4 applies, some or all of those sheets may be marked "superseded."*

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/US04/38643

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims 1-25	YES
	Claims 26-44	NO
Inventive Step (IS)	Claims NONE	YES
	Claims 1-44	NO
Industrial Applicability (IA)	Claims 1-44	YES
	Claims NONE	NO

2. Citations and Explanations (Rule 70.7)
Please See Continuation Sheet

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of:

V. 2. Citations and Explanations:

Claims 1-23 lack an inventive step under PCT Article 33(3) as being obvious over GROSENBACH et al. Synergy of vaccine strategies to amplify Antigen-specific Immune Responses and Anti-tumor Effects. Cancer Research. June 2001, vol. 61, 4497-4505 in view of US 6,537,552 B1 (MINION et al.) 25 March 2003 (25.3.2003).

GROSENBACH et al. provides guidance on a tumor vaccine therapy using an attenuated vaccinia (Wyeth) vector that encodes CEA and three co-stimulatory molecules (B7-1, ICAM-1, LFA-3) (Abstract; pg. 4498 Materials and Methods). Where the vaccine is co-administered with GM-CSF to enhance the T-cell responses and the vaccine/ GM-CSF combination is administered at three different time points over 28 days (pg. 4498 Materials and Methods).

MINION et al. supplements the guidance of GROSENBACH et al. by teaching a vaccine comprising a vaccinia virus encoding Muc-1 that is co-administered with GM-CSf, to treat pancreatic cancer (col. 6, line 55-col. 8, line 28; col.9, lines7-24)

Based on the guidance provided by GROSENBACH et al. it would have been obvious to the person of ordinary skill in the art at the time the invention was made to add the Muc-1 sequence taught by MINION et al. to the vaccinia vaccine taught by GROSENBACH et al. in order to produce a more vigorous T cell immune response against the pancreatic tumor.

The practitioner would be motivated to add the Muc-1 sequence taught by MINION et al. to the vaccinia vaccine taught by GROSENBACH et al. because GROSENBACH et al. teaches that a more vigorous T cell response produces a greater anti-tumor effect.

The person of ordinary skill in the art would have a reasonable expectation of success because the use of use of the Muc-1 sequence taught by MINION et al. comprises a minor modification to the vaccinia vaccine taught by GROSENBACH et al.

Supplemental Box

Claims 24 and 25 lack an inventive step under PCT Article 33(3) as being obvious over the prior art as applied in the immediately preceding paragraph and further in view of US 5,827,666 (FINN et al.) 27 October 1998

FINN et al. supplements the guidance of GROSENBACH et al. and MINION et al. by teaching how to make and use synthetic Muc-1-like analogs, consisting of tandem repeats of Muc-1 (Abstract). Where muc-1 like proteins containing multiple repeats that can be administered in order to inhibit the growth of pancreatic cancer (col. 5, lines 22-45; col. 6, lines 60-65). FINN et al. teaches that these proteins are superior at generating an immune response than MUC-1 since they contain repeated immuno-stimulatory epitopes (Col. 4, lines 40-67).

The practitioner would be motivated to use the tandem repeat Muc-1 sequence taught by FINN et al. in the vaccinia vaccine taught by GROSENBACH et al. because FINN et al. teaches that the multiple repeats are more immuno-stimulatory than the native MUC-1

The person of ordinary skill in the art would have a reasonable expectation of success because the use of the tandem repeat Muc-1 sequence taught by FINN et al. comprises a minor modification to the vaccinia vaccine taught by GROSENBACH et al.

Claims 26-44 lack novelty under PCT Article 33(2) as being anticipated by WO 03/100060 A2 (BURDEN et al.) 4 December 2003.

BURDEN et al. provides guidance on an isolated nucleic acid comprising a gene encoding a MUC-1 derivative having less than 10 tandem repeat units. Wherein, the nucleic acid construct is comprised in a construct useful in nucleic acid methods for the treatment of tumors (Abstract). Wherein the MUC-1 derivative is plasmid JNW319 7x VNTR MUC-1, which has 97.2% sequence homology with SEQ ID NO:2, thus qualifying JNW319 as a variant of SEQ ID NO:2. Therefore reference of BURDEN et al. anticipates the claims as presently drafted.

Claims 1-44 meet the criteria set out in PCT Article 33(4), and thus have industrial applicability because the subject matter claimed can be made or used in industry.

---------- NEW CITATIONS ----------

WO 03/100060 A2 (BURDEN et al.) 4 December 2003, see Abstract, entire document.